

FORM PTO-1390 REV. 2/01T		U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		03438.0085	
INTERNATIONAL APPLICATION NO.		INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/NO00/00307		September 19, 2000	September 20, 1999
TITLE OF INVENTION WHIRLPOOL			
APPLICANT(S) FOR DO/EO/US Kjell CHRISTENSEN			
Applicant(s) herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
1.	<input checked="" type="checkbox"/>	This is a FIRST submission of items concerning a filing under 35 U.S.C 371.	
2.	<input type="checkbox"/>	This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.	
3.	<input type="checkbox"/>	This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.	
4.	<input checked="" type="checkbox"/>	The US has been elected by the expiration of 19 months from the priority date (Article 31).	
5.	<input checked="" type="checkbox"/>	A copy of the International Application as filed (35 U.S.C. 371 (c)(2)).	
	a. <input type="checkbox"/>	is attached hereto (required only if not communicated by the International Bureau).	
	b. <input checked="" type="checkbox"/>	has been communicated by the International Bureau.	
	c. <input type="checkbox"/>	is not required, as the application was filed with the United States Receiving Office (RO/US).	
6.	<input checked="" type="checkbox"/>	An English language translation of the International Application as filed (35 U.S.C. 371 (c)(2)).	
	a. <input checked="" type="checkbox"/>	is attached hereto.	
	b. <input type="checkbox"/>	has been previously submitted under 35 U.S.C. 154 (d)(4).	
7.	<input checked="" type="checkbox"/>	Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3)).	
	a. <input type="checkbox"/>	are attached hereto (required only if not communicated by the International Bureau).	
	b. <input type="checkbox"/>	have been communicated by the International Bureau.	
	c. <input type="checkbox"/>	have not been made; however, the time limit for making such amendments has NOT expired.	
	d. <input checked="" type="checkbox"/>	have not been made and will not be made.	
8.	<input type="checkbox"/>	An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).	
9.	<input type="checkbox"/>	An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).	
10.	<input type="checkbox"/>	An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).	
Items 11 to 20 below concern document(s) or information included:			
11.	<input type="checkbox"/>	Information Disclosure Statement under 37 CFR 1.97 and 1.98	
12.	<input type="checkbox"/>	An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.	
13.	<input type="checkbox"/>	A FIRST preliminary amendment.	
14.	<input type="checkbox"/>	A SECOND or SUBSEQUENT preliminary amendment.	
15.	<input type="checkbox"/>	A Substitute specification.	
16.	<input type="checkbox"/>	A change of power of attorney and/or address letter.	
17.	<input type="checkbox"/>	A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821-1.825.	
18.	<input type="checkbox"/>	A second copy of the published international application under 35 U.S.C. 154 (d)(4).	
19.	<input type="checkbox"/>	A second copy of the English language translation of the international application 35 U.S.C. 154 (d)(4).	
20.	<input checked="" type="checkbox"/>	Other items or information:	
	a. <input checked="" type="checkbox"/>	Copy of cover page of International Publication No. WO 01/21130	
	b. <input type="checkbox"/>	Copy of Notification of Missing Requirements.	
	c. <input type="checkbox"/>		

U.S. APPLICATION NO. (Unknown see 37 CFR 1.5) 10/088535	INTERNATIONAL APPLICATION NO PCT/NO00/00307	ATTORNEY'S DOCKET NUMBER 03438.0085		
21. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):		CALCULATIONS PTO USE ONLY		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO		\$1040.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO		\$890.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search fee (37 CFR 1.445(a)(2)) paid to USPTO		\$740.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4)		\$710.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33 (1)-(4)		\$100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT = <input type="text" value="1040.00"/>				
Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)).		<input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/>		
CLAIMS		NUMBER FILED	NUMBER EXTRA	RATE
Total Claims		15	- 20 =	x \$18.00
Independent Claims		2	-3 =	x \$84.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+\$280.00
TOTAL OF THE ABOVE CALCULATIONS =			\$1320.00	
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.			\$660.00	
SUBTOTAL =			\$660.00	
Processing fee of \$130.00 for furnishing the English translation later than months from the earliest priority date (37 CFR 1.492(f)).		<input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/>	\$	
TOTAL NATIONAL FEE =			\$660.00	
Fee for recording the enclosed assignment (37 CFR 1.21 (h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property.		<input type="checkbox"/> +		
TOTAL FEES ENCLOSED =			\$660.00	
			Amount to be refunded:	\$
			charged:	\$
<p>a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>660.00</u> to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>06-0916</u>. A duplicate copy of this sheet is enclosed.</p> <p>d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</p>				
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.				
SEND ALL CORRESPONDENCE TO: Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P. 1300 I Street, N.W. Washington, D.C. 20005-3315				
 SIGNATURE Ernest F. Chapman, Reg. No. 25,961 NAME/REGISTRATION NO.				
DATED: March 20, 2002				

Whirlpool

JC10 Rec'd PCT/PTO 20 MAR 2002

The invention relates to a whirlpool or massage bathtub, comprising a tub part with a bottom which is provided with through-flow apertures for the supply of air to water in the whirlpool bathtub, and with devices for supplying air to the through-flow apertures.

The invention also relates to a valve device for a whirlpool bathtub, for supplying air to the whirlpool bathtub and draining water from the whirlpool bathtub.

Whirlpool or massage bathtubs are essentially based on two principles:

10 hydromassage, where jets of water are ejected from the walls of the tub, and air systems, where the water in the tub is set in motion by air bubbles which are supplied from the bottom of the tub and possibly also the walls. Combinations of these two principles have also been employed.

15 Traditionally, whirlpool or massage bathtubs based on these principles have resulted in solutions where water or air is supplied from a pump device, through a system of hoses or pipes, to nozzles mounted in the bottom or the walls of the tub.

20 There are major disadvantages connected with such solutions. The most important objection is associated with cleaning. A system of hoses or pipes creates the basis for so-called biofilm, which results in the growth of algae, bacteria and fungi, and in such a system it is difficult to gain access for cleaning. Circulating water with added cleaning fluids can partially redress this problem, but a more thorough cleaning process requires access for mechanical washing with brushes or the like, which has been shown to be difficult or impossible to accomplish with the closed hose or pipe systems.

25 An important requirement for whirlpool or massage bathtubs is that they should be able to be manufactured from/with simple, cost-effective materials, components and methods. A tub based on extensive use of hoses and pipe connections does not fulfil this requirement.

30 A whirlpool or massage bathtub is known in the prior art where some of the above drawbacks are partially overcome. On the market there is a whirlpool or massage bathtub by the name of Hurricane (illustrated, e.g., in the product brochure "the only one which is washable..." from Fjordbad AS, dated 1.

February 1998). This bathtub is a whirlpool bath where air is supplied from a pump device to nozzles mounted in the bottom of the tub. However, the pump device is not connected to the nozzles by means of hoses or pipes. Instead, the tub is equipped with a removable, upper bottom element in the 5 form of a plate, matching the shape immediately above the bottom of the bathtub, where the nozzles are composed of apertures in the upper bottom element. Together with the bottom of the actual tub, the upper bottom element forms a defined chamber to which air is supplied from the pump device. During operation the chamber is placed under higher air pressure than 10 atmospheric pressure, and the air is distributed to the individual nozzles, where it flows out, producing a whirlpool and massaging effect in the water in the tub, on the top of the removable bottom element.

This solution offers the possibility of more efficient cleaning. The upper 15 bottom element can be removed from the tub by means of four screws, whereupon those parts of the tub and the bottom element which together form the interior of the chamber can be efficiently cleaned by simple means and with easy access.

This known solution overcomes many of the said disadvantages associated 20 with cleaning, but it has also been shown to involve new problems.

One significant problem is the technical difficulties connected with 25 producing a removable bottom element which will exactly match the shape of the bathtub, and which will provide a tight seal with the lower part of the tub's walls while the chamber under the bottom element is placed under air pressure from the pump device. This problem can be solved by means of gaskets, but this solution should be avoided, since it can create new problems 30 with the growth of bacteria and the like in connection with the gaskets. The manufacture of a hard, upper bottom element which provides a tight seal without the use of gaskets has been shown to require complicated and costly production processes, which depend, amongst other things, on the extensive use of manual craftsmanship.

Another problem with the known solution is that the removable, upper bottom element is heavy and relatively difficult for the user to release and lift out. The known, upper bottom element has a weight of 13 kg, and 4 screws have to be loosened, whereupon it has to be lifted out by means of a special

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tool in the form of a lifting ring. This cumbersome process has in many cases led to a tendency for the tub not to be cleaned as often and as thoroughly as was intended.

5 A further drawback with the known solution is that the bottom element will require a fixed, predetermined distribution of air apertures over the surface of the bottom element. This offers no opportunity for a user to select and vary the areas which will be provided with air apertures, and which areas will not.

10 The known solution also makes it difficult and expensive to replace the bottom element with another, if it is desirable to alter certain characteristics such as the number, size and distribution of air apertures for the bottom element.

15 EP-A-0 450 396 discloses a device for use with a bathtub, where a mixture of air and water is supplied to the water in the bathtub by means of an external pump. The bathtub bottom is provided with a recess, delimited at the top by a cover, constituting a chamber which is further divided into sections for feeding air/water mixture and for return of water, respectively. The cover is detachable by means of clips. Apparently, the publication does not address the problem of simultaneously providing satisfactorily sealing, effective and convenient cleaning, simple manufacturing and preventing the growth of 20 bacteria etc.

25 GB-A-2 217 986 discloses a drainage valve for a whirlpool tub, arranged for simultaneously draining of the bathtub and associated pipework. The publication does not address the problem of providing a valve for both supplying air into the bathtub and draining water from the bathtub. Particularly, the publication does not disclose a special valve geometry which provides for short tubing lengths, thereby facilitating easy access and convenient cleaning.

30 The object of the present invention is to provide a whirlpool bathtub and a valve device as mentioned in the introduction, which is not encumbered by the above disadvantages.

The object is achieved with a whirlpool bathtub and a valve device of the type mentioned in the introduction, which are characterized by the features which are indicated in the claims.

The invention will now be described in more detail with reference to the drawings, in which

fig. 1 illustrates a cross section of a bathtub according to the invention, taken along the intersecting line A-A in fig. 2,

5 fig. 2 is a top view of a bathtub according to the invention, and

fig. 3 illustrates a valve device for use with a bathtub according to the invention.

Figure 1 illustrates a cross section of a bathtub 1 according to the invention. The tub 1 consists of a tub part 21 comprising walls and a bottom 2 with two recesses 2a and 2b. Each recess is bounded and surrounded by a preferably rounded edge or rim, designated by 7a and 7b respectively, each of which has at least one substantially horizontal, upper portion. The substantially horizontal portion advantageously has a width in the horizontal direction in the range of 3 mm to 10 mm, and specially preferred around 5 mm.

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The tub part 21 is advantageously moulded from an artificial fibre material, preferably glass-fibre reinforced polyester, but it may alternatively be made in other known ways such as, e.g., vacuum forming of sheet material, for example acryl. In the illustrated, preferred embodiment the recesses 2a, 2b are circular and of equal size. Even though the circular shape offers special advantages, the recesses may well have a different shape within the scope of the invention. The recesses may have different sizes, and their number may differ from two.

5 The recesses are arranged to be covered by two bottom elements or bottom elements 3a and 3b. When the bottom elements 3a, 3b are arranged for covering the recesses 2a and 2b, each bottom element 3a, 3b abuts closely against the horizontal, upper portion of the edges 7a and 7b respectively which surround the recesses. The bottom elements 3a, 3b are designed with a shape corresponding to the edges 7a, 7b of the recesses, and are slightly 10 larger than the recesses 2a, 2b, with the result that when they are placed over the recesses 2a, 2b, they define chambers 8a, 8b. The adaptation in the radial direction between the bottom elements and the edges surrounding the recesses does not require a particularly high degree of precision, since it is not crucial for the sealing between the bottom elements and the edges 7a, 7b 15 of the recesses. On the other hand, the bottom elements and the edges surrounding the recesses both require to be flat, which is far easier to achieve 20 than an exact match between the shape of the edges and that of the bottom elements in the radial direction.

25 Each of the bottom elements is equipped with a hole 5a, 5b for attachment, a screw 4a, 4b being placed between each hole and screwed into threaded attachment devices 6a, 6b in the bottom of the tub part 21. In the illustrated embodiment the attachment devices comprise threaded sleeve 6a, 6b, for example of brass, moulded into the bottom of the tub part 21. The holes 5a, 5b in each bottom element 3a, 3b are preferably located in the centre of the 30 bottom element. The screws 4a, 4b are advantageously made of a plastic material, and they preferably have a head which is adapted to countersinks in the holes 5a, 5b. The head of the screw is preferably equipped with means for manual influence without the use of tools, such as, for example, indentations suitable for two fingers. The screws, however, may be of another suitable 35 type or material, or alternatively use may be made of other, known per se

attachment means for bringing the bottom elements into releasable, sealed connection with the edges 7a, 7b round the bottom's recesses 2a, 2b.

The bottom elements are further equipped with a number of apertures 9 which represent air nozzles where air under pressure from the chambers 8a,

5 8b is supplied to the water in the tub. By varying the size and/or number of apertures, different characteristics can be obtained for the massaging effect which is produced by the apertures when the bathtub is used. In a preferred standard embodiment, which provides a normal massaging effect, each bottom element has 28 apertures, each with a diameter of 6 mm. In an

10 alternative embodiment, which provides a softer massaging effect, each bottom element has 63 apertures, each with a diameter of 4 mm. With 10 apertures, each with a diameter of 10 mm, a considerably harder massage is obtained. When using an alternative number of apertures it is an advantage to adapt the area of each aperture in such a way that the total area of all the

15 apertures is approximately constant. This is due to the fact that it is desirable to have an optimal, not excessive overpressure in the chamber under the bottom element. This in turn is due to the fact that such an overpressure leads to undesirable temperature reduction in the air when it leaves the chamber and is discharged into the water. The greater the pressure difference between

20 the chamber and the surroundings, the greater the temperature reduction.

The shape of the apertures 9 is preferably circular, but other known per se shapes for nozzle apertures may be employed. If so desired, known per se inserts may be placed in the apertures, for example in the form of an umbrella-shaped cover over the aperture, in order to achieve special air flow 25 or massaging effects. In order to ensure thorough cleaning and overall efficiency and comfort, however, use is preferably made of circular apertures with no such inserts.

The apertures 9 may be distributed over substantially the entire bottom element 3a, 3b. Air nozzles/apertures 9 which are placed directly in contact

30 with certain body parts, particularly the abdomen, of a user of the bathtub, however, may cause the user discomfort or inconvenience. It is therefore an advantage to omit apertures in an area of the bottom element 3a, 3b, as illustrated in fig. 2. In such a case, when installing the bottom elements 3a, 3b, it is possible to choose which parts of the tub's total bottom area should 35 be without apertures 9. This is done by rotating each bottom element 3a, 3b

to a desired angular position over the recesses 2a and 2b respectively, in the horizontal plane. This is possible since the bottom elements 3a, 3b are circular, and since the attachment holes 5a, 5b are arranged in the centre of the bottom elements.

5 The horizontal portion of the rim surrounding each recess is completely flat in the illustrated embodiment in fig. 1. If the bottom element is displaced slightly from its centre position, and the rounded edge of the bottom element thereby abuts against a curved portion of the wall of the bathtub, the result may be that the bottom element is slightly raised from its seat, and leakage 10 may occur. If the curvature of the bottom element and the curved portion of the wall of the bathtub are designed to exactly agree, this problem will not arise, but in practice the tolerance requirements should not be too great for the match between the said curvatures.

15 In order to prevent the above-mentioned situation, in an alternative embodiment (not illustrated), the horizontal portion of the rim surrounding each recess is also provided with a raised back or ridge which extends along the entire rim surrounding the recess. The back advantageously has a height between 0.2 and 2.0 mm, and specially preferred around 1.0 mm. The back, moreover, has a width in the range of 4 to 8 mm, and specially preferred 20 around 6 mm. The raised back's upper cross sectional surface is rounded, and advantageously is approximately in the form of a circular arc. This alternative embodiment results in the bottom element, if it is slightly displaced from its centre position, abutting against a perpendicular portion of the wall of the tub part, and not against the curved portion. Thus further 25 contributes, therefore, to preventing leakage between the rim and the bottom element.

Figure 2 is a top view of a whirlpool bathtub 1 according to the invention, where a valve device 11 in connection with the lower bottom of the tub is also illustrated, even though it is actually located embedded in the tub part 21 30 and thus in reality is not visible. In figure 2 a line A-A is shown, indicating the section which is illustrated in figure 1, and the letter B indicates from which direction figure 1 is viewed. The valve device 11 is intended to provide supply of a first fluid to the chambers 8a, 8b and emptying of a second fluid from the tub to a plug hole. The valve device 11 has an inlet 12 35 for a first fluid, which is usually air. When the whirlpool bathtub is in

operation, the valve device 11 distributes the air to two outlets 10a, 10b, which transfer the air to the chambers 8a, 8b. The inlet 12 and the outlets 10a, 10b consist of pipes with a circular cross section, which for the reasons mentioned at the beginning concerning harmful formation of algae, bacteria, etc., should be made as short as possible. The valve device 11 is therefore mounted at a short distance from the two chambers 8a, 8b, and also preferably at a short distance from a pump device (not illustrated). It is particularly important that a substantially horizontal part of the connection between the pump device and the inlet 12 should be made as short as possible, since the problem of deposits and growth formation is greatest in horizontal portions of such connections.

In figure 1 it is indicated that the top of the tub 1 may have an oval shape, but other suitable shapes are equally suitable, for example, kidney-shaped, super-elliptical, egg-shaped, hexagonal, rectangular, rectangular with one or two convexly curved sides, or rectangular with rounded corners. Where the tub is equipped with more than two recesses and bottom elements, for example three, the upper edge of the tub may, for example, assume the form of a circle, a trefoil, a triangle, a triangle with rounded corners, a quarter circle or a quarter circle with a rounded corner. In its simplest form, the tub has only one recess and one bottom element.

The above examples require that the recesses with associated bottom elements should lie substantially in the same horizontal plane. The invention, however, is not limited to such embodiments. In a special embodiment the tub may include five recesses with associated bottom elements, four of which are peripherally arranged in a first, upper horizontal plane in a trefoil pattern, with the result that the centres of the recesses form the corners of a square, while the fifth recess is centrally arranged in a second, lower located horizontal plane, symmetrically centred between the first four. A tub of this kind is well-suited to simultaneous use by four people, the first four bottom elements forming seats, while the lower, fifth bottom element forms a central recess for the feet of the bathers. In this case channels have to be provided for transport of fluid, both air and water, between each of the four peripheral recesses and the fifth, central recess. Such channels can involve a risk of the formation of undesirable growth, and it must therefore be made as short as possible, while being sufficiently large in cross section to be easily accessible for mechanical cleaning, e.g. with brushes. In this case a valve

device for both supply of air from a pump device and for emptying water from the tub is mounted in the fifth, central recess.

For each embodiment of the tub the bottom elements may advantageously be made of an artificial fibre material, and preferably of a completely or partly

5 transparent material. In the choice of material, account should be taken, amongst other things, of the fact that the bottom elements must be able to withstand the air pressure and changes in the air pressure inside the chambers during repeated start-ups and over a long period, without causing leakages between the bottom elements and the edges 7a, 7b surrounding the recesses

10 2a, 2b. The material must be relatively rigid, so that it does not yield too much under the weight of bathers. When choosing material account should also be taken of the fact that the weight of the bottom elements must not be too great, and naturally the material must be impervious to the fluid used, which usually means waterproof, and be resistant to the fluid and any

15 additives to the fluid. The use of a completely or partly transparent material is not only for aesthetic reasons, but has the technical effect that it makes it easier to observe when the chambers ought to be cleaned. On the basis of these considerations clear or shaded acryl has been found to be a preferred material.

20 Figure 3 illustrates an embodiment of the valve device 11 in closer detail, viewed from side C in fig. 2. The valve device 11 has two functions. It is partly intended to receive a first fluid, normally air, from the inlet 12, illustrated by a dotted circle, and distribute the first fluid to the outlets 10a, 10b for supply to the chambers 8a, 8b. The valve device 11 is also partly
25 intended to act as a drain valve for a second fluid, normally water, from the bathtub 1 to a plug hole 13 for the second fluid. The valve device comprises a housing 22, equipped with a first, essentially horizontal inlet 12 for the first fluid, at least two essentially horizontal outlets 10a, 10b for the first fluid, an upper, vertical inlet for the second fluid, and a lower, vertical plug hole 13 for the second fluid. At the plug hole 13 the housing 22 has a conical shape
30 which forms a valve seat. Inside the housing there is mounted a closing device 14 which around a lower part comprises a seal 15, preferably in the form of an O-ring. The closing device 14 is connected to a lifting device 16 which can move the closing device from a closed, lower position to an open,
35 non-illustrated upper position. The lifting device 16 can be operated by a person using the bathtub, by means of known per se, non-illustrated

mechanical transfer devices, for example a linkage rod. The closing device 14 with the seal 15 is arranged to close the plug hole 13 in the closed state, i.e. the lifting device's lower position, thus preventing the passage of the second fluid. In the open state, i.e. the lifting device's upper position, the 5 closing device will permit the second fluid to pass from the bathtub down into the plug hole 13.

The valve device 11 combines the supply and drainage functions for the first and second fluids respectively in a particularly effective manner, where the supply means for the first fluid, normally air, have been made very short. The 10 closing device 14 is vertically removable for cleaning, and when the closing device 14 is removed, easy access is gained to the internal parts of the valve device, including the outlets 10a, 10b, for cleaning, thereby providing easy cleaning and little formation of deposits, growth and so on.

Where the bathtub is provided with more than two recesses with associated 15 bottom elements in the tub part in substantially the same horizontal plane, for example three recesses and three bottom elements, the valve device will have a corresponding number of outlets for the first fluid, arranged in a suitable manner distributed round the circumference of the valve device, with the result that both the outlets and the inlet for the first fluid are as short as 20 possible.

By providing bathtubs of different types with two or more equal-sized recesses, the same type of bottom element can be employed in the different bathtubs. As a result the production of the bottom elements becomes 25 considerably simpler and far more cost-effective than if the bottom elements had a shape adapted to suit the bottom of each type of bathtub.

The requirements regarding precision in the construction of the bottom elements are substantially reduced, since it is far easier to produce bottom elements which are flat than bottom elements which have a high precision in the radial direction. According to the invention it thereby becomes far 30 simpler to achieve an adequate match between the bottom element and the edges surrounding the recesses in the lower bottom. Obtaining a match becomes particularly easy where the bottom elements are circular, where a fixing screw mounted in the centre of the bottom element provides a uniform distribution of force along the circumference, resulting in a uniform, tight

seal. A special advantage of a simple and cost-effective production of the bottom elements is that it is possible to replace the bottom elements with new bottom elements of an alternative design in a simple and inexpensive manner. Such alternative bottom elements may have the same external shape, while 5 other characteristics such as, for example, number, size, design and/or distribution of nozzle apertures, or characteristics associated with material, surface design or colour, may be different. By providing the bathtub with two or more recesses and bottom elements, the simultaneous advantage is obtained that a valve device as described gives an efficient distribution of the 10 first fluid to the two chambers under the bottom elements in the tub, with short supply channels. The drawbacks mentioned at the beginning with which previously known solutions are encumbered are thereby avoided.

PATENT CLAIMS

1. A whirlpool bathtub (1), comprising
 - a tub part with a bottom which is provided with through-flow apertures for supplying air to water in the whirlpool bathtub, and devices for supplying air to through-flow apertures, wherein
 - the bottom (2) is provided with at least one recess (2a, 2b) which is flow-relatedly connected with the devices for supply of air,
 - each recess (2a, 2b) is surrounded by a substantially horizontal sealing edge (7a, 7b),
 - each recess (2a, 2b) is covered by a bottom element (3a, 3b) which abuts sealingly against the recess's sealing edge (7a, 7b), the recess and the bottom element together forming a distributing chamber (8a, 8b) for air, and
 - the bottom elements (3a, 3b) are provided with through-flow apertures (9) for air from the supply chambers (8a, 8b) to water in the whirlpool bathtub, characterised in
 - that the sealing edges (7a, 7b) and the bottom elements (3a, 3b) are symmetrical about vertical axes through the central areas of the recesses, and
 - that the bottom elements (3a, 3b) are provided with centrally located attachment devices (4a, 4b) which act together with corresponding attachment devices (6a, 6b) in central areas of the recesses.
2. A whirlpool bathtub according to claim 1, characterized in that it comprises at least two identically shaped recesses (2a, 2b).
3. A whirlpool bathtub according to claims 1-2, characterized in that the sealing edges (7a, 7b) and the bottom elements (3a, 3b) are circular.
4. A whirlpool bathtub according to claims 1-3, characterized in that the bottom elements' through-flow apertures (9) are arranged asymmetrically about the vertical axes.
5. A whirlpool bathtub according to claims 1-4, characterized in that the bottom elements (3a, 3b) are rotatable about the centrally located attachment devices (4a, 4b), for rotating the bottom

elements to a desired position with regard to the position of the through-flow apertures (9).

6. A whirlpool bathtub according to claims 2-7,
characterized in that the at least two recesses (2a, 2b) are supplied with air
5 from the same device.

7. A whirlpool bathtub according to claims 1-6,
characterized in that the device for supply of air is a combined device (11)
for supply of air and draining of water.

8. A whirlpool bathtub according to claims 1-7,
10 characterized in that
- the tub part is designed with one recess located in a lower horizontal plane
and an additional number of recesses located in an upper horizontal plane,
and that
- each recess which is located in the upper horizontal plane is fluid-relatedly
15 connected with the recess in the lower horizontal plane by a channel.

9. A whirlpool bathtub according to claims 1-8,
characterized in that the device (11) for supply of air and draining of water is
20 composed of a valve device comprising a housing (22) which is provided
with an inlet (12) for air and outlet (10a, 10b) for air to each of the recesses,
an inlet for water from the whirlpool bathtub and an outlet (13) for water to a
plug hole, and a valve for closing the outlet for water.

10. A valve device (11) for a whirlpool bathtub, for supplying air to the
whirlpool bathtub and draining water from the whirlpool bathtub,
characterized in that
25 - it comprises a valve housing, at least two horizontal outlets (10a, 10b) for
air, a substantially vertical inlet for water and a substantially vertical outlet
(13) for water,
- the outlets (10a, 10b) for air are provided in a plane between the inlet for
water and the outlet (13) for water,
30 - it comprises a valve for closing the outlet (13) for water, comprising a
substantially horizontal valve seat in the housing and a vertically movable
closing body (14) which by means of a lifting device (16) is movable
between an open position where water is permitted to flow through the valve

device and a closed position where an outlet closing portion of the closing body abuts against the valve seat, closing the outlet for water.

11. A valve device according to claim 10,
characterized in that the inlet and the outlet for water are substantially
5 coaxial.

12 A valve device according to claims 10-11,
characterized in that the closing body (14) also comprises an inlet closing
portion adapted for closing or substantially closing the inlet for water.

13. A valve device according to claims 10-12,
10 characterized in that the closing body (14) is substantially in the form of two
truncated cones with the narrow ends facing each other, the outlet closing
portion being provided in the wide end of a lower cone and the inlet closing
portion being provided in the wide end of an upper cone, and the area with
15 the cones' narrow ends is arranged for the passage of air to the recesses when
the valve device is located in the closed position.

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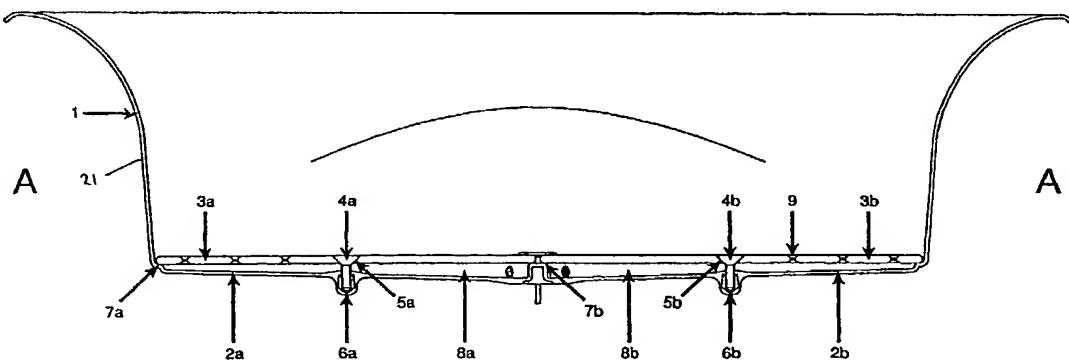
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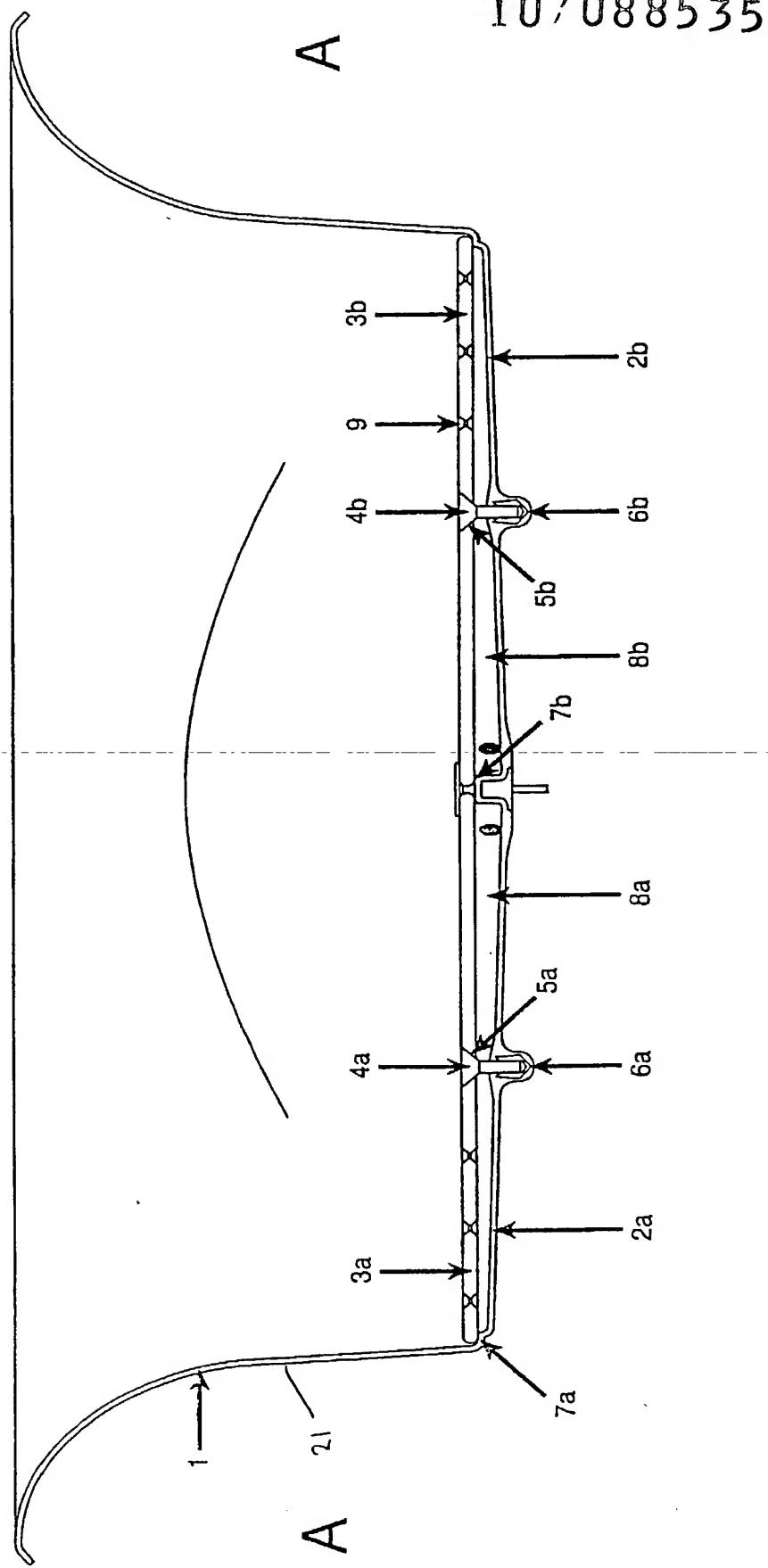
(54) Title: WHIRLPOOL



(57) Abstract: The invention relates to a whirlpool bathtub (1) and a valve device (11) for such a tub. The tub comprises a moulded tub part (21) and at least one, preferably two removable, circular bottom elements (3a, 3b) which match recesses (2a, 2b) in the tub part. The bottom elements can be attached to the tub part by means of central screws (4a, 4b). From an external pump device air is supplied to the valve device (11) and on to preferably two defined chambers (8a, 8b) in the tub, each of which is composed of a recess with associated bottom element. Each bottom element has apertures (9) for the supply of air from the chambers to the water in the bathtub. The valve device (11) simultaneously constitutes a bottom valve for draining water from the tub to a plug hole. The tub is easy to keep clean, and may in addition be manufactured in a simple and cost-effective manner.

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Fig. 1



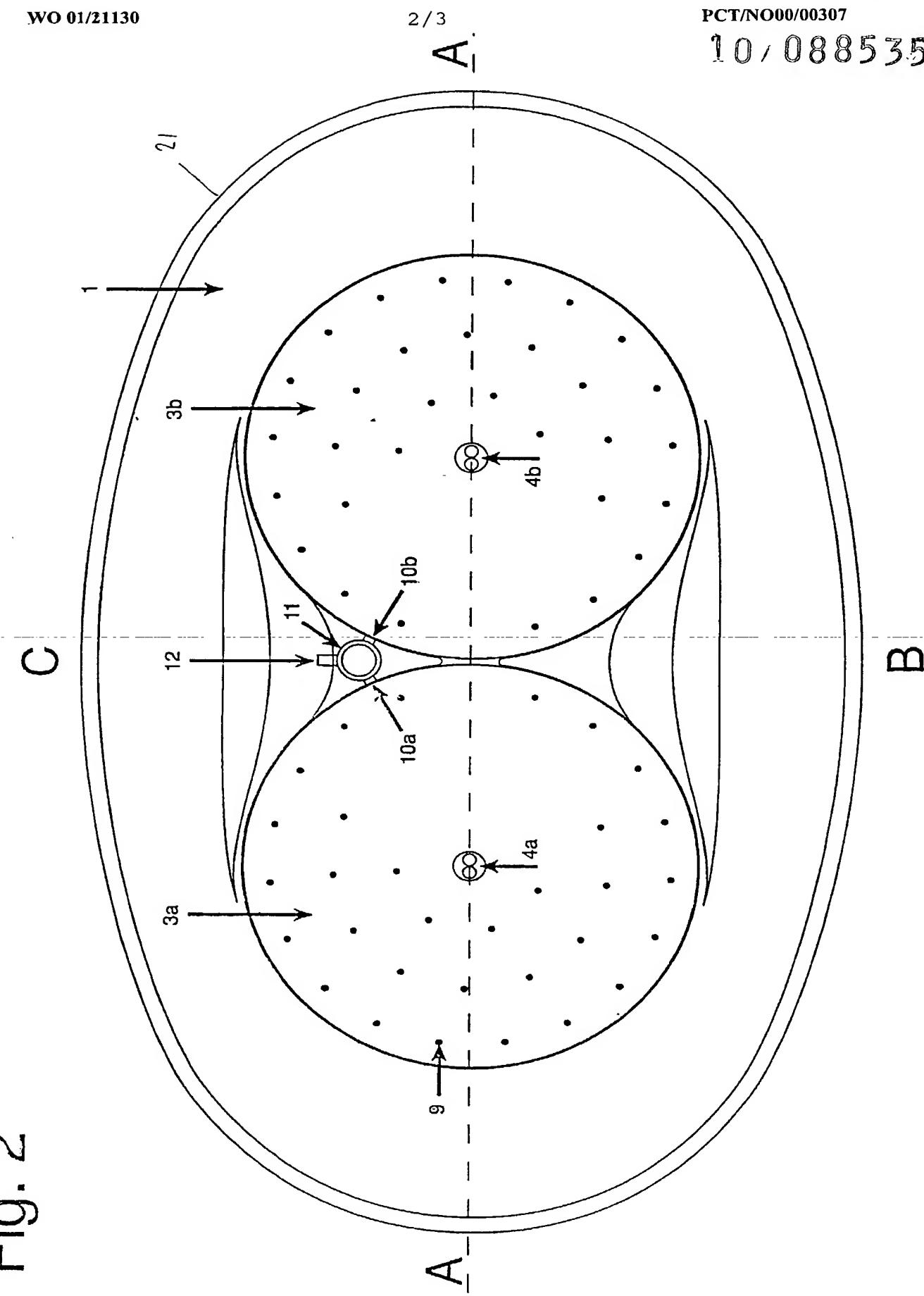


Fig. 2

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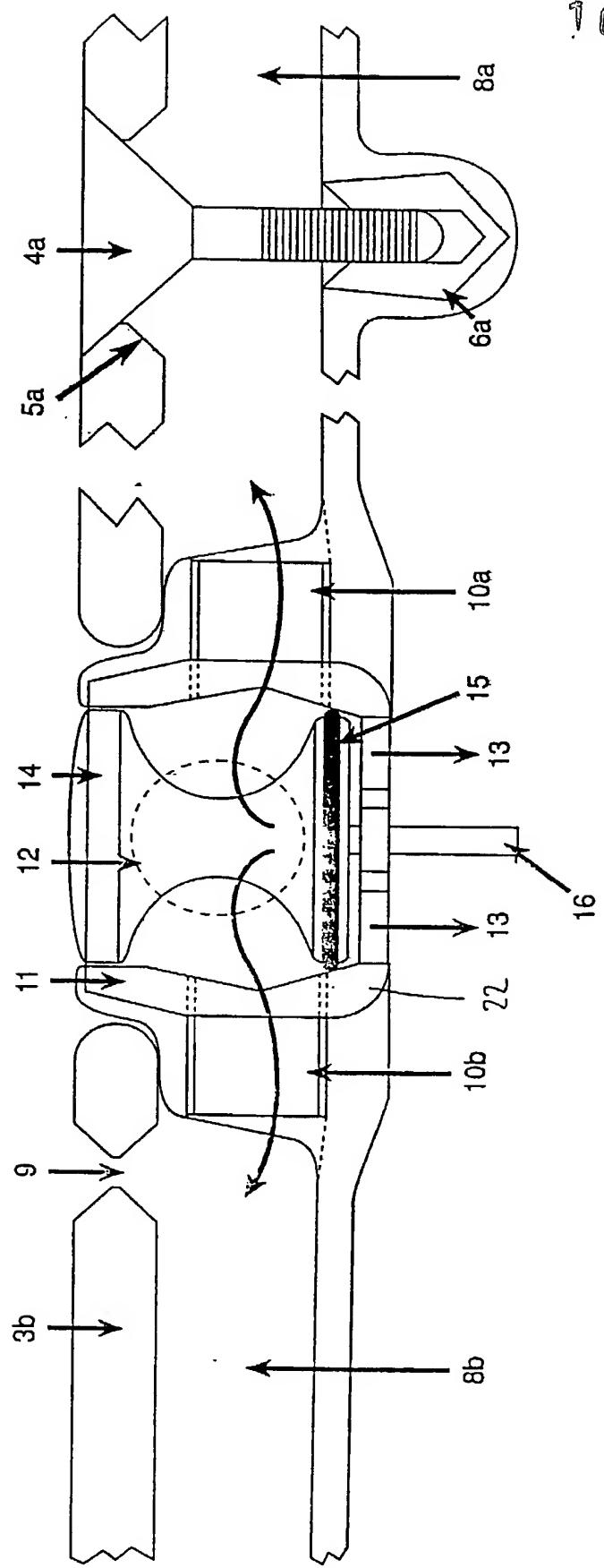


Fig. 3

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

WHIRLPOOL, the specification of which is attached and/or was filed on 19 Sept. 2000 as United States Application Serial No. 09/800,030 or PCT International Application No. PCT/N000/00307 and was amended on 15 Nov. 2001 (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate or § 365(a) of any PCT international application(s) designating at least one country other than the United States, listed below and have also identified below, any foreign application(s) for patent or inventor's certificate, or any PCT International application(s) having a filing date before that of the application(s) of which priority is claimed:

Country	Application Number	Date of Filing	Priority Claimed Under 35 U.S.C.
Norway	19994567	20 September 1999	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
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I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

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Application Number	Date of Filing	Status (Patented, Pending, Abandoned)

168 I hereby appoint the following attorney and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. FINNEGANT HENDERSON, FARABOW, GARRETT & DUNNER, L.L.P., Douglas B. Henderson, Reg. No. 20,291; Ford F. Farabow, Jr., Reg. No. 20,630; Arthur S. Garrett, Reg. No. 20,338; Donald R. Dunner, Reg. No. 19,073; Brian G. Brunsbold, Reg. No. 22,593; Tipton D. Jennings, IV, Reg. No. 20,645; Jerry D. Voight, Reg. No. 23,020; Laurence R. Hefta, Reg. No. 20,827; Kenneth E. Payne, Reg. No. 23,098; Herbert H. Mintz, Reg. No. 26,691; C. Larry O'Rourke, Reg. No. 26,014; Albert J. Santorelli, Reg. No. 22,610; Michael C. Elmer, Reg. No. 25,857; Richard H. Smith, Reg. No. 20,609; Stephen L. Peterson, Reg. No. 26,325; John M. Romary, Reg. No. 26,331; Bruce C. Zotter, Reg. No. 27,680; Dennis P. O'Reilly, Reg. No. 27,932; Allen M. Sokal, Reg. No. 26,695; Robert D. Bajefsky, Reg. No. 25,387; Richard L. Stroup, Reg. No. 28,478; David W. Hill, Reg. No. 28,220; Thomas L. Irving, Reg. No. 28,619; Charles E. Lipsey, Reg. No. 28,165; Thomas W. Winland, Reg. No. 27,605; Basil J. Lewis, Reg. No. 28,818; Martin I. Fuchs, Reg. No. 28,508; E. Robert Yoches, Reg. No. 30,120; Barry W. Graham, Reg. No. 29,924; Susan Haberman Griffen, Reg. No. 30,907; Richard B. Racine, Reg. No. 30,415; Thomas H. Jenkins, Reg. No. 30,857; Robert E. Converse, Jr., Reg. No. 27,432; Clair X. Mullen, Jr., Reg. No. 20,348; Christopher P. Foley, Reg. No. 31,354; John C. Paul, Reg. No. 30,413; Roger D. Taylor, Reg. No. 28,992; David M. Kelly, Reg. No. 30,953; Kenneth J. Meyers, Reg. No. 25,146; Carol P. Einaudi, Reg. No. 32,220; Walter Y. Boyd, Jr., Reg. No. 31,738; Steven M. Anzalone, Reg. No. 32,025; Jean B. Fordis, Reg. No. 32,984; Barbara C. McCurdy, Reg. No. 32,120; James K. Hammond, Reg. No. 31,964; Richard V. Burgulian, Reg. No. 31,744; J. Michael Jakes, Reg. No. 32,824; Thomas W. Banks, Reg. No. 32,719; Christopher P. Isaac, Reg. No. 32,616; Bryan C. Diner, Reg. No. 32,409; M. Paul Barker, Reg. No. 32,013; Andrew Chango Sonu, Reg. No. 33,457; David S. Forman, Reg. No. 33,694; Vincent P. Kovalick, Reg. No. 32,867; James W. Edmondson, Reg. No. 33,871; Michael R. McGurk, Reg. No. 32,045; Joann M. Neth, Reg. No. 36,363; Gerson S. Panitch, Reg. No. 33,751; Cheri M. Taylor, Reg. No. 33,216; Charles E. Van Horn, Reg. No. 40,266; Linda A. Wadler, Reg. No. 33,218; Jeffrey A. Berkowitz, Reg. No. 36,743; Michael R. Kelly, Reg. No. 33,921; James B. Monroe, Reg. No. 33,971; Doris Johnson Hines, Reg. No. 34,629; Allen R. Jensen, Reg. No. 28,224; Lori Ann Johnson, Reg. No. 34,498; and David A. Manspeizer, Reg. No. 37,540 and *Please address all correspondence to FINNEGANT HENDERSON, FARABOW, GARRETT & DUNNER, L.L.P., 1300 I Street, N.W., Washington, D.C. 20005, Telephone No. (202) 408-4000.*

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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Listing of Inventors Continued on Page 2 hereof. Yes No

January 2000

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